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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
WILKINS III, HARRY D

ART UNIT	PAPER NUMBER
1742	4

DATE MAILED: 05/31/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

ME=4

Office Action Summary	Application No.	Applicant(s)	
	09/822,037	WANG, GUANGXIN	
	Examiner	Art Unit	
	Harry D Wilkins, III	1742	

-- Th MAILING DATE of this communication appears on the cov r she t with the correspondenc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-72 is/are pending in the application.

4a) Of the above claim(s) 1-32 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 33-72 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 29 March 2001 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-32, drawn to a method of electrolytically forming a material, classified in class 205, subclass 557.

II. Claims 33-72, drawn to a material, classified in class 420, subclass 417.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product can be made by another and materially different process, such as by a melting process.

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

4. During a telephone conversation with Dr. David Latwesen on 3 April 2002 a provisional election was made with traverse to prosecute the invention of Group II, claims 33-72. Affirmation of this election must be made by applicant in replying to this Office action. Claims 1-32 have been withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 40 and 41 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 40 and 41 claim the material of claim 38 comprising either more Ti than Ta or more Ta than Ti. However, no basis is given for determining the scope of "more". For example, see the composition taught by Hirao et al (US 5,059,297) at col 6, lines 45-52. This composition, by atoms, contains more Ti, but, by weight, contains more Ta. Thus, claims 40 and 41 should be amended to recite by which basis the "more" comparison is utilized. Further examination will be based on "by weight" because all of the other claims recite weight percent as the basis for the amount of elements present.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 42, 43, 49, 53, 54, 58, 59, 60, 64 and 68 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Hard et al (US 4,595,413).

Hard et al anticipates the invention as claimed. Hard et al teach (see claims 1-6) a material (powder) which consists essentially of titanium, zirconium or hafnium in an

amount of at least 90 wt%, with a further addition of up to about 10 wt% Nb. This metallic alloy material anticipates claims 42 and 43.

In regards to claims 49 and 53, 90 wt% of the material can be titanium.

In regards to claims 54 and 58, 90 wt% of the material can be hafnium.

In regards to claims 59 and 60, 10 wt% of the material can be niobium.

In regards to claims 64 and 68, 90 wt% of the material can be zirconium.

9. Claims 33, 37, 38, 39, 41, 42, 43, 44, 47, 49, 51, 69, 70 and 72 rejected under 35 U.S.C. 102(b) as being clearly anticipated by Hirao et al (US 5,059,297).

Hirao et al anticipate the invention as claimed. Hirao et al teach (see col 6, lines 45-52) a sputtering target (i.e.-PVD target) that contains 60 at% Ti (28.4 wt%) and 40 at% Ta (71.6 wt%).

Regarding claims 42 and 43, Hirao et al teach a metallic alloy material that contains Ta and Ti.

Regarding claims 44, 47, 49 and 51, Hirao et al teach a material that contains 28.4 wt% Ti and 71.6 wt% Ta.

Regarding claims 70 and 72, Hirao et al teach a PVD target that consists of Ta and Ti.

10. Claims 42-45, 49, 50, 54-56, 59-61 and 64-66 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Onishi et al (US 5,976,641).

Onishi et al anticipates the invention as claimed. Onishi et al teach (see abstract) a material (thin film) that consists essentially of one of Ti, Zr, Hf, Nb and Ta at

0.1-10 at% with the balance being Al. This metallic alloy material anticipates claims 42 and 43.

Regarding claims 44-46, the material may contain up to 42.7 wt% (10 at%) Ta.

Regarding claims 49 and 50, the material may contain up to 16.5 wt% (10 at%) Ti.

Regarding claims 54-56, the material may contain up to 42.4 wt% (10 at%) Hf.

Regarding claims 59-61, the material may contain up to 27.7 wt% (10 at%) Nb.

Regarding claims 64-66, the material may contain up to 27.3 wt% (10 at%) Zr.

11. Claims 42-44, 47, 48, 54, 55, 56, 64, 65 and 66 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Tobioka et al (JP 63-166797).

Tobioka et al anticipate the invention as claimed. Tobioka et al teach (see English abstract) a material (heating element) that contains Ta as a primary element and the remainder being Zr or Hf. This metallic alloy material anticipates claims 42 and 43.

Regarding claims 44, 47 and 48, Tobioka et al teach (see English abstract) that the material contains 60-99 wt% Ta.

Regarding claims 54, 55 and 56, Tobioka et al teach (see English abstract) that the material may contain 1-40 wt% Hf.

Regarding claims 64, 65 and 66, Tobioka et al teach (see English abstract) that the material may contain 1-40 wt% Zr.

12. Claims 33, 37-39, 41-44, 48-50, 69, 70 and 72 rejected under 35 U.S.C. 102(b) as being clearly anticipated by Yagi (JP 03-142883).

Yagi anticipates the invention as claimed. Yagi teaches (see English abstract) metallic alloy material that consists essentially of Ta and 10 wt% Ti.

Regarding claims 37, 39, 69, the target material of Yagi is used in sputtering, which is a form of PVD (physical vapor deposition).

Regarding claim 38, the target material of Yagi consists of a mixture of Ta and Ti.

Regarding claim 41, the material of Yagi contains more Ta than Ti.

Regarding claims 42 and 43, as a first element, Yagi selects Ta, and as a second element, Yagi selects Ti, thus forming the metallic alloy target material.

Regarding claims 44 and 48, Yagi teaches (see English abstract) that the alloy contains 90 wt% Ta.

Regarding claims 49 and 50, Yagi teaches (see English abstract) that the alloy contains 10 wt% Ti.

Regarding claim 70 and 72, Yagi teaches (see English abstract) a PVD target that contains 90 wt% Ta and consists of Ta and Ti.

13. Claims 33-53, 59-62, 64 and 66-72 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Muenz (EP 0 603486 A2).

Muenz anticipates the invention as claimed. Muenz teaches (see Derwent abstract) a metallic alloy mixture that contains Ti, Zr or Cr plus 2-50 at% Ta or Nb. Thus, Muenz teaches Ti-Ta, Ti-Nb, Zr-Ta, Zr-Nb, Cr-Ta and Cr-Nb.

Regarding claims 33-41, Muenz teaches a metallic alloy mixture that contains Ti and Ta. The material contains from 7.16 wt% to 79.1 wt% Ta with the balance being Ti (92.84 wt% to 20.9 wt% Ti). Muenz teaches (see last sentence of Derwent abstract)

that the alloys are made into targets. These targets are used for vapor deposition of the metal, and thus would inherently be considered to be PVD targets.

Regarding claims 42, 43 and 69, the metallic alloy targets of Muenz anticipate the claimed material.

Regarding claims 44-48, the Ti-Ta alloy target may contain 7.16 wt% to 79.1 wt% Ta.

Regarding claims 49-53, the Ti-Ta alloy target may contain 20.9 wt% to 92.84 wt% Ti.

Regarding claims 59-62, the Ti-Nb alloy target may contain 3.81 wt% to 66.0 wt% Nb.

Regarding claims 64 and 66-68, the Zr-Nb alloy target may contain 49.5 wt% to 97.96 wt% Zr.

Regarding claims 70-72, Muenz teaches a PVD target that comprises Ta at 7.16-79.1 wt% and consists of Ta and Ti.

14. Claims 33-53 and 69-72 are rejected under 35 U.S.C. 102(b) as being clearly antcipated by Oohashi et al ("Composition and Structure of Co-Sputtered Ta-Ti Alloy Thin Films").

Oohashi et al anticipate the invention as claimed. Oohashi et al teach (see first column) seven targets for sputtering which are Ta-Ti alloys. The alloys contain 2.6 wt%, 12.0 wt%, 39.3 wt%, 50.9 wt%, 68.1 wt%, 77.0 wt% and 88.3 wt% Ta.

Regarding claims 33-37, Oohashi et al teach a sputtering target material which contains only Ta and Ti, and one example that contains 12.0 wt% Ta. Sputtering is a form of PVD, thus, the targets of Oohashi et al are PVD targets.

Regarding claims 38-41, Oohashi et al teach a sputtering target material that contains only Ta and Ti, and two examples contain 12.0 wt% Ta and 68.1 wt% Ta. Thus, Oohashi et al teaches the material contains either more Ti than Ta or more Ta than Ti. Sputtering is a form of PVD, thus, the targets of Oohashi et al are PVD targets.

Regarding claims 42, 43 and 69, the metallic alloy (PVD) target of Oohashi et al is a material that consists of a mixture of two elements that form an alloy.

Regarding claims 44-53, Oohashi et al teach materials that contain 12.0, 39.3, 50.9, 68.1, 77.0 and 88.3 wt% Ta, which correspond to 88.0, 60.7, 49.1, 23.0 and 11.7 wt% Ti.

Regarding claims 70-72, Oohashi et al teach a PVD target that consists of Ta and Ti with 39.3 wt% Ta.

15. Claims 42, 43, 44, 46, 47, 59, 61, 62 and 69 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Eck et al ("Properties and production of powder-metallurgical PVD-sources").

Eck et al anticipate the invention as claimed. Eck et al teach (see page 133) Ta50Nb (i.e.-50 wt% Ta, 50 wt% Nb) plates for sputter targets. These targets are a metallic alloy mixture of Ta and Nb.

Regarding claims 44, 46, 47, 59, 61 and 62, the material of Eck et al contains 50 wt% each of Ta and Nb.

Regarding claim 69, the material of Eck et al is in the form of a sputter target (i.e.-a PVD target).

16. Claims 42, 43, 49, 51, 54, 57 and 69 rejected under 35 U.S.C. 102(b) as being clearly anticipated by Bugliosi et al ("Performance Evaluation of Innovative PVD Coatings for Different Complex-Shaped HSS Cutting Tools").

Bugliosi et al anticipate the invention as claimed. Bugliosi et al teach (see page 574) a metallic alloy material for a PVD target that is 32.22 wt% Ti and 67.78 wt% Hf.

Regarding claims 49, 51, 54 and 57, the composition disclosed by Bugliosi et al is within the claimed range.

17. Claims 33, 34, 37-40, 42-44, 46, 49, 52 and 69-72 rejected under 35 U.S.C. 102(b) as being clearly anticipated by Heikinheimo et al ("High Temperature Bonding of Alumina-based CMC to Metals").

Heikinheimo et al antcipate the invention as claimed. Heikinheimo et al teach (see page 303, second column) a Ti-Ta alloy PVD coating that contains 42 wt% Ta.

Regarding claim 34, the alloy contains 58 wt% Ti.

Regarding claim 38, the alloy is a material that consists of a mixture of Ti and Ta.

Regarding claim 40, the alloy contains more Ti than Ta.

Regarding claims 37, 39 and 69, though Heikinheimo et al do not recite that the material is in the form of a target, one of ordinary skill in the art would have considered the alloy to inherently be in the form of a PVD target before the alloy was formed into a PVD coating.

Regarding claims 42 and 43, the metallic alloy is a material that consists of Ti and Ta.

Regarding claims 44, 46, 49 and 52, the alloy contains 42 wt% Ta and 58 wt% Ti.

Regarding claims 70-72, the alloy is inherently used as a PVD target (see above regarding claims 37, 39 and 69) and consists of 42 wt% Ta and 58 wt% Ti.

18. Claims 42, 43, 59, 62 and 63 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Ludtke et al ("Electron-beam Physical Vapor Deposition of Microlaminate Composites").

Ludtke et al anticipate the invention as claimed. Ludtke et al teach (see abstract) a material which contains Nb and Al.

Regarding claim 43, the material is a metallic alloy.

Regarding claims 59, 62 and 63, the material has formula of either NbAl or Nb_3Al. These compositions correspond to Nb contents of 64.1 wt% and 84.3 wt%.

Conclusion

19. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Shirosaka et al (JP 04-182950) teach a Ta target that has 0.1-10 at% of Al, Si, Ti, Sn, Zr or Hf added into the alloy.

b. Sawada et al (JP 01-290766) teach a high purity Ta target with 0.1-2 at% Ti added in.

c. Bunshah (US 3,791,852) teaches (see col 5, lines 15-21) that Ti, Zr, Hf, V, Nb and Ta have been used as PVD targets.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D Wilkins, III whose telephone number is 703-305-9927. The examiner can normally be reached on M-F 7:30am-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V King can be reached on 703-308-1146. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Harry D Wilkins, III
Examiner
Art Unit 1742

hdw
May 29, 2002

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